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A METHOD OF PRESERVING ALGÆ.

ALGÆ for demonstration purposes may be preserved without trace of shrinkage and mounted for permanent use in the following manner: Kill and fix in Flemming's weaker formula (10^{cc} 1 per cent. osmic acid; 10^{cc} 1 per cent. acetic acid; 25^{cc} 1 per cent. chromic acid; 55^{cc} distilled water). This may be used from one-half hour to twenty-four hours or more without injury to delicate tissues. Next drop 10 per cent. glycerine directly into the fixative. Be careful to allow each drop to diffuse before adding more. This guards against shrinkage which is caused by diffusion currents if glycerine is added too rapidly. Continue adding drop by drop until enough glycerine has been put in to cover the specimens when evaporated. The fixative and water should now be allowed to evaporate in a watch glass where a large surface is exposed. The specimens may now be handled with a needle or knife and arranged on the slide under a dissecting microscope. A drop of pure glycerine or of glycerine jelly makes a very satisfactory mount. Glycerine jelly has to be used very carefully, but it is the more satisfactory when it can be used with success. Filamentous forms should be cut while fresh into pieces of convenient length for handling.

This glycerine method is extremely convenient for preserving fruiting forms, for demonstration of swarm spore and zygospore formation. The more delicate stages may be fixed and mounted on the slide so that they need only be handled once. The method was devised and thoroughly tested in the laboratory of Lake Forest University last year. Since leaving Lake Forest I have used it successfully in preserving red algæ at Wood's Holl. Some of them, as Dasya, retain their color almost perfectly under this treatment. Although color in green algæ is more or less sacrificed, the chromatophores retain their shape perfectly, while the cells as a whole become even clearer than fresh material.—CHAS. THOM, *Missouri State University.*

NOTES ON THE WOODY PLANTS OF THE SOUTH ATLANTIC STATES.

I HAVE collected at several places in the mountains of the southern states a Fothergilla which is evidently distinct from the coastal plant. Descriptions of both are given, taken from a large number of specimens. The Alabama plant I have not seen.

FOTHERGILLA CAROLINA (L.) Britt. A low shrub with erect or spreading branches, reaching a height of 0.6^{m} or rarely 1^{m}: leaves 2 to 4^{cm} long, 1 to 2^{cm} wide, oblong or obovate, rounded or cuneate at base, obtuse and usually emarginate at apex, denticulate to coarsely crenate above, thickish, dull green and smooth on the upper surface, below paler and somewhat glaucous, smoothish or soft pubescent with brown or fulvous hairs, with 3 or 4 pairs of prominent straight veins; petiole pubescent, 2 to 4^{mm} long; stipules minute, 2 to 3^{mm} long, deciduous: terminal bud and young twig soft pubescent, bud 3 to 4^{mm} long: style 6 to 8^{mm} long: capsule clothed with fulvous pubesence, the styles erect and parallel: seed 4 to 5^{mm} long.

I have been unable to secure specimens of this plant from farther south than southern South Carolina, but expect that the plant which has been collected in central Alabama is referable to this species.

Fothergilla monticola, sp. nov. A bushy shrub, commonly dividing near the base into erect virgate branches, with dark brown or reddish minutely roughened bark, reaching an average height of about 1.2^{m}, or exceptionally even 2.5^{m}: leaves 8 to 12^{cm} long, 5 to 8^{cm} wide, oval, broadly obovate or nearly orbicular, cordate, subcordate or truncate and unequal at base, rounded or obtusely pointed at apex, irregularly crenulate or undulate even to the base, membranaceous, bright green on both sides, smooth or nearly so even when young, the 4 to 6 pairs of prominent parallel veins terminating in short mucros; petiole slender, 1 to 1.5^{cm} long; stipules ovate-lanceolate, acuminate, 5 to 7^{mm} long, somewhat persistent: terminal bud naked, flattened, sericeous, about 5^{mm} long: twigs mostly smoothish, red-brown: flowers unknown, but style 1^{cm} long, evidently longer than in *F. Carolina:* spikes 3 to 5^{cm} long: capsules larger than the preceding, clothed with grayish pubescence; styles divergent: seed grooved at the top, 6^{mm} long.

Rocky woods, mountains of Virginia to South Carolina, between 400 and 1200^{m} elevation.

The only published name which could possibly apply to this species is *Fothergilla major* Lodd.[1] This description is from cultivated plants which seem to be only vigorous specimens of *F. Carolina*, and are described as having spikes over three inches in length, late in flowering, and leaves broad and much toothed. The limited distribution of *F. monticola*, and the fact that none of the early American botanists recognized more than one species, though Elliott remarks that the species (the coast plant) is variable in the color of its stamens, and possibly contains more than one species, would seem to show that the mountain species was unknown to them. Dr. M. A. Curtis was aware of the occurrence of a Fothergilla in the western part of North Carolina of greater size and with larger leaves than the plant of the eastern part of the state.

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[1] Botanical Cabinet, 1720.

ZENOBIA SPECIOSA PULVERENTULA (Michx.). (*Andromeda speciosa* var. *pulverentula* Michx. Fl. **1** : 256). Leaves thinner, more oval, crenate, persistently densely white pulverulent beneath.—A well-marked form, sometimes growing with the type, but usually separate, occurring in North and South Carolina.

SMILAX AURICULATA Walter. There seems to be no reason why this name should not replace the later *S. Beyrichii* of Kunth. The only objection urged against applying Walter's description to this species is that he gives the color of the berries as being purple, while they are black when ripe. All through the winter, however, until they ripen in the spring, they can be found all shades of purple.

SMILAX LAURIFOLIA BUPLEURIFOLIA Delile occurs from eastern South Carolina, where it was originally collected by Curtis, to southern Virginia. Its very long and narrow leaves make it quite distinct from *S. laurifolia*, though in other respects I can detect no difference.

SMILAX LANCEOLATA L. is usually considered to be an annual-fruiting species, but the few specimens which I have found in fruit evidently ripen their seed the spring after the summer when they flowered. It does not flower until July, and the berries, which by winter are yet small, remain green or somewhat reddish until the following spring.

Quercus pagodæfolia (Ell.), nom. nov.

Q. falcata var. *pagodæfolia* Ell. Bot. **2** : 605.
Q. digitata pagodæfolia (Ell,) Ashe, Handbook of N. Car. 47. 1896.

Leaves oval or oblong, 8 to 12^{cm} long, 4 to 8^{cm} wide, with 3 to 6 pairs of prominent straight veins, and as many usually entire narrowly triangular lobes separated by deep rounded sinuses, the lobes divaricate or projecting somewhat towards the apex, thick, above dark green, below persistently white tomentose; petiole 3 to 4^{cm} long, slender, tomentose: twig 2 to 3^{mm} thick, persistently white tomentose: buds 2 to 4^{mm} long, acutish, bright brown, the scales nearly smooth : cup 1 to 2^{cm} wide, shallow, scales large for the group, appressed, smooth or downy; nut barely 1^{cm} thick, scarcely larger than that of *Q. digitata*, globose, one-half enclosed in the cup: seed yellow and bitter.

A large tree reaching a height of 25 to 32^m and a diameter of 0.8 to 1.1^m, with an oval or oblong crown and spreading branches, the rough checkered bark of the trunk dark gray or blackish and somewhat striped, that of the limbs smoothish and dark gray. River swamps eastern Virginia and North Carolina to southwestern Georgia. Although not a common tree, several specimens usually occur together where it is found. It is usually associated with *Quercus Michauxi*, *Q. nigra*, and *Liquidambar*. The original locality of Elliott is on the Roanoke river near Weldon, N. C.; he also found it in South Carolina. I have found it on the bottom lands of the Roanoke, Neuse, and Cape Fear rivers in North Carolina, where it extends some distance westward in the Piedmont plateau region; and in southwestern Georgia where it occurs along the Flint river.

This tree is evidently not a hybrid, as it shows no intermediate characters between *Q. digitata* and any other species. The shape of the nut is globular as is that of *Q. digitata*, the cup somewhat deeper; the pubescence is white, while that of *Q. digitata* is more often tawny and is more persistent than that of *Q. pagodæfolia*.

QUERCUS TEXANA, which is a rare tree in the Atlantic states, seems to be entirely absent from the coastal region. In North Carolina it is confined to the Piedmont plateau, but does not occur above an altitude of 200^m. In northern Georgia it is found as high as 350^m. In certain parts of the Flint river valley of southwestern Georgia it is more common, often being associated with the red oak, from which, under the common name of spotted oak, it is often not distinguished by the inhabitants.

ILEX LÆVIGATUS (Pursh) Gr. occurs abundantly in certain parts of eastern North Carolina and South Carolina, though it does not seem to have been recorded at all from this region. There can be but little doubt that this is the *Ilex lanceolatus* of Chapman's *Flora* (*Prinos lanceolatus* Hill, Veg. Syst. **16**: 57. *pl. 61*) as the description and distribution agree well with that given for the *Prinos lanceolatus*. In this case the earlier *lanceolatus* will replace *lævigatus*. I have specimens of the plant from nine localities in North and South Carolina, all of them between 40 and 100 miles of the coast.

ILEX AMELANCHIER M. A. Curtis. Several stations have been found for this uncommon plant in North Carolina and one in southern Virginia. It has not hitherto been reported from further north than the original station at Society Hill, S. C. While not entirely confined to the Piedmont region of the Carolinas it seldom enters the coastal plain, and does not occur above an altitude of 350^m.

Ilex Beadlei, nom. nov. *Ilex mollis* of southern authors, and in part that of Gray's Manual. *Prinos dubius* Don[2] is usually given as a synonym for this species, but the original description will scarcely apply to *I. Beadlei*, and the distribution assigned to *Prinos dubius*, from North Carolina to New Jersey, barely even extends as far south as the most northern point where *I. Beadlei* is known to occur. The distribution of *I. Beadlei* is from Kings mountain, North Carolina, westward through the southwestern part of North Carolina, to northern Georgia, eastern Tennessee, and probably to northern Alabama. This species reaches its best development and is most abundant in and around Ocoee county, Georgia. The name proposed for the species is in honor of Mr. C. D. Beadle, Curator of the Biltmore Herbarium.

ILEX AMBIGUA (Michx.) Chapm., which is the smallest and most delicate of the southern species of the genus, probably does not occur north of the Neuse river in North Carolina, its distribution terminating with that of the sand hills on which it grows.

RHUS AROMATICA MOLLIS (Gray) (*R. Canadensis* var. *mollis* Gr.) occurs in North and South Carolina only in the Piedmont region, not being found above 250^{m} altitude. Besides being densely pubescent beneath, the leaflets, in all the specimens which I have seen, are considerably broader than in *R. aromatica*.

DENDRIUM BUXIFOLIUM PROSTRATUM (Loud.) (*Leiophyllum prostratum* Loud.), collected from the summit of Table Rock at 1000^{m} altitude, has nearly the same characters as that from the summit of Roan mountain, at nearly twice that altitude, while *B. buxifolium*, collected at an altitude only a few meters below that of Table Rock, has the oblong and more scattered leaves of the coast plant, and can scarcely be distinguished from it in the dried material. Though slight, the characters between the two plants seem to be well marked and persistent.— W. WILLARD ASHE, *Forester*, *Geol. Survey*, *Raleigh*, *N. C.*

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[2] Mill **2** : 20.